Overview of walking development in infancy and early childhood

Infants grow and develop very quickly, and the early stages of development are characterised by progression through common developmental milestones that start with early movement, through standing, cruising around the furniture and walking. The achievement of independent walking heralds an exciting time for parents.

Common concerns around milestones related to walking include whether the development is typical (or not), if the shape and development of the feet are correct, if the infant is walking correctly, and what types of shoes parents should buy to support their infant's feet during early weight bearing. Through understanding the typical changes that take place during the early years, health visitors can advise parents, offer reassurance and refer for additional support and assessment when it is appropriate.

This Good Practice Points (GPP) resource is the second in a series of two GPPs. The first GPP covers foot development in infancy and early childhood.

It is helpful to note that every infant is different and they will adopt different solutions for how they 'find their feet' and learn to move around. Some babies will crawl before standing and then walking, whereas others will bottom shuffle or commando crawl before walking. The sequence of these developmental events is important as they prepare the body for standing. For an infant to stand and walk, they need to have the muscle strength to move and support the body and the correct motor control, coordination and balance to remain upright and act on information from the surrounding environment. The feet have a critical role in these tasks, supporting the body, enabling balance and interaction with the local environment.

Below is a brief summary of some of the typical stages that happen when infants learn to walk:

- **Finding their feet**: At around 4 months, babies will start to grasp and 'find their feet'. Soon after, they will begin kicking their legs and pushing their feet against surfaces. These early movements require infants to use the different muscles to learn the different movements in readiness for the next step. It will not be long before they will begin to sit up and support themselves. Health visitors need to be aware of the signs of atypical motor development in infants 0-6 months old. Early detection of neurological conditions, like cerebral palsy and spinal muscular atrophy, is important as early diagnosis can significantly improve the prognosis for these children.
- **On the move**: As the feet and leg muscles get stronger, infants will demonstrate more advanced movements, using their limbs to move around and direct themselves whilst on their belly or by crawling on their hands and knees. During this time, the muscles and bones in the feet are developing to support the body. Infants will use furniture and other props to pull themselves up. They will fall down repeatedly, but will keep practising until they are able to pull up to standing with support. Soon they will be taking their first steps (approximately 9 – 12 months) whilst using furniture for support. This is the first time that the feet are used to support the whole body.

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- **No holding back**: As infants are learning to walk, they will use strategies such as cruising the furniture (at about 12 months), stepping with support and then walking on their own (between 12 and 18 months).

Further information can be found in Sheridan, Sharma and Cockerill (2014).

Typical variants of walking development that commonly raise concerns in parents

Infants develop at different rates and the typical presentation(s) of the feet and legs during the early years can raise concerns for parents, leading to requests for referral to health professionals (Yeo, James, Ramanchandran, 2015) such as physiotherapists, orthopaedic specialists and podiatrists. In most instances, these are typical presentations but, when indicated, it is important that atypical progression is identified and referred early. It is important that health visitors are able to recognise the common normal variants in development in infancy and signs that may indicate underlying problems that require a more detailed assessment. There are many useful resources to inform health visitors' understanding of this topic (such as the Bayley Scales of Infant and Toddler Development).

The following is a brief overview of the common variants, with chronological age(s) presented as a guide:

- **Bow legs (Genu varum)** - When infants start walking, it is common for their legs to curve outwards (this is known as bow legs); sometimes this can look worse because of clothes and nappies. Bowing of the legs is common until approximately 2 - 3 years of age when the legs begin to straighten. In some rarer instances, bowing of the legs can be a result of vitamin D or calcium deficiency (known as rickets) (see additional resources below) and further advice may be indicated. Reasons for seeking health professional advice could also be if only one leg is affected, there are: differences between the length of the legs, asymmetrical leg creases, difficulties moving or playing, and/or pain.
- **Tiptoe walking** - Tiptoe walking is common in infants that have just started weight bearing and walking i.e. the infant/ child walks on their tiptoes, with their heels not touching the ground. For most children this will be a short-term phase, which should resolve by approximately two years, with no longer-lasting issues. Reasons to seek health professional advice include unusual neurological findings, if one leg is affected, the child cannot stand with the heels in contact with the floor, or persisting tiptoe walking.
- **Knock knees (Genu valgum)** - Children will go through a phase of having knock knees as their legs develop (this is the opposite of bow legs) and is where the knees touch when standing. This typically happens in young children between 2 and 4 years of age. There can be several reasons why the legs adopt this position but, in most instances, this is developmental. If one leg is affected, the child struggles with activity or presents with pain, referral for advice would be appropriate.
- **In-Toeing** – Some children will walk with their feet turned in towards each other, often called "pigeon-toe" by the parents. This is quite common and, in most cases, this does not require any treatment, and should resolve spontaneously. Cases which persist, or where there is an obvious problem with leg movements because of their position, may require advice from a health professional. In-toeing is frequently seen and a result of one of the following: (1) Metatarsus adductus; (2) Tibial torsion; (3) Femoral anteversion. Asymmetrical presentations should always be referred for assessment.
- **Out-Toeing** – Out-toeing is where children walk with their feet turned outwards. This is not as common as in-toeing and the appearance may be exacerbated by the position of the legs (e.g. knock knees) or feet (e.g. flat feet). This should resolve without the need for intervention. If one leg is affected, the child struggles with activity, presents with pain or there is impact of milestone attainment, referral for advice would be appropriate.
- **Flat feet (Pes planus)** – Concerns about shape of the feet during infancy are very common. However, children's feet are constantly growing and changing shape; the feet can appear flat until approximately 4 - 6 years of age. This is normal and should not be of concern unless the feet are painful. It would be appropriate to seek health professional advice if only one foot is "flat", or they appear to be affecting how the child moves.

Any issues that parents report about their child's mobility (e.g. not achieving or loss of milestones) concerns with tripping and falling, or not wanting to stand on one limb are important "red flags" for referral for further assessment and intervention, if needed.

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Useful Resources

NHS Overview: Rickets and Ostemalacia
http://bit.ly/2LAtwhI

Paediatric Musculoskeletal Matters
https://bit.ly/2N8WK7O

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